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DISCUSS APPLICATION OF HIGH-SPEED METHODS; LAGGING TBILISI PLANT NOW EXCEEDS PLAN

AIM FOR COMPLETE CONVERSION TO HIGH-SPEED METHODS -- Leningradskaya Pravda, 26 Jun 51

During the second half of 1950, 92 percent of all cutting tools in operation at the Leningrad Machine-Tool Building Plant imeni Sverdlov were hard-alloy tools used on lathes and milling machines.

The ever-increasing application of high-speed methods of metal-working is being reflected in all technical and economic indexes of plant activity. For example, in 1949, 5,611 norm hours were required for the manufacture of one 262-G boring machine; last year, this figure was reduced to 4,417, and this year, to 3,139 norm hours.

At present, 40 percent of the plant's machine-tool park has been converted to high-speed methods. Eight sections are now operating at high speeds. All machine-tool operators at machine shop No 4 are high-speed workers. Plant personnel have set a goal to convert all types of machine tools to operate under high-speed conditions.

Mass production of multiedge hard-alloy cutting tools has been perfected at the plant. At present, the output of drills, reamers, counterborers, and other tools needed for converting all metal-cutting equipment of the enterprise to high-speed methods has been increased.

DESCRIBE CONVERSION OF LATHES TO HIGH-SPEED CUTTING -- Stalinabad, Kommunist Tadzhikistana, 17 Jul 51

The Soviet machine-tool-building industry is producing a large quantity of high-speed, powerful metal-cutting machine tools, fully utilizing the cutting properties of modern hard-alloy tools. However, conversion of the existing park of metal-cutting machine tools will take a comparatively long time.

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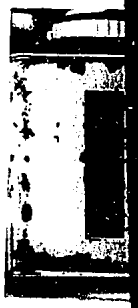

The power, speed, and rigidity of machine tools are the main factors which must be taken into consideration in their conversion to high-speed methods.

Increase in power must begin with an increase in the power of the electric motor. Experience has shown the unsuitability of flat-belt drives and the shortcomings of friction clutches in the gear train. The slipping of any one of these causes the cutting edge of the hard-alloy tool to chip. For this reason, the flat-belt drive should be replaced by a V-belt.

The DIP-200, DIP-20M, and similar lathes are most widely disseminated among Soviet enterprises. The power of these machine tools can be increased 1½ times. Four- or five- step pulleys must be manufactured for transmitting this power, and the number of friction clutch disks must be increased accordingly.

The speed of these machine tools at small enterprises can be increased by increasing the diameter of the driving pulley. As experience has shown, this increase is possible within the range of 25-35 percent by defining the safety factor of the machine tool more precisely.

An increase in power and speed of lathes brings with it the need for increased rigidity and vibration resistance. Increasing the rigidity by extensive changes in design is not practical. For this reason, the most important condition for obtaining sufficient rigidity is to install and secure the machine tool on a concrete foundation.

Vibration can be reduced and rigidity increased in many ways. For example, radial and longitudinal play of the spindle and excessive clearance between moving parts can be eliminated, bolts and screws tightened, and worn-out screws replaced by new ones.

In addition to reinforcing connected parts, careful balancing of chucks or attachments fitted on the spindle is very important. Poorly made cutting tools can also cause vibration. The cutting tools should fit in their holders on all surfaces. In some cases, vibration of the cutter can be eliminated by placing under it a rubber cushion 1.5-2 millimeters thick.

The extents of overhang of the spindle and the chuck or attachment fitted on it, the overhang of the cutter from the holder, or the overhang of the tailstock center from the tailstock has a definite bearing on machine rigidity. Reducing the amount of overhang to a minimum will greatly increase the rigidity of these units.

A large number of parts are machined between centers on a lathe. The machining of such parts at high speeds is impossible if conventional dead centers are used. Existing designs of live centers do not possess adequate rigidity. In addition, they wear rapidly and lose their accuracy. It is recommended that live centers be built into the tailstock spindle.

The modernization of turret lathes is comparatively simple because these machine tools are built with adequate power and speed. In addition, existing turret lathes have a wide margin of safety, which permits their conversion to high speeds with slight modification.

DEVELOP, PERFECT NEW VIBROSCOPE -- Leningradskaya Pravda, 2 Jun 51

Among the problems which arise in high-speed methods of metal cutting is machine-tool vibration. Moreover, determining the cause of vibration is not an easy matter.

Existing methods of eliminating vibration have become obsolete. In some cases, vibration has been decreased by reinforcing foundations. However, this does not solve the problem for those machines located on the second or third floor of a plant.

Although vibrographs and oscillographs can be used to determine the cause of vibrations, for the most part these are available only at laboratories of institutes. Dynamic balancing machines might answer the question, but many plants, electric power stations, mts, etc., do not have these special machines.

This problem, which would appear unsolvable, does have an answer. Soviet engineers have developed an instrument called a vibroscope which was perfected at the Leningrad Tool Plant. It consists of a vibrometer, an electrical section, and a stroboscopic bulb, all housed in a portable case. The total weight of the instrument is 5 kilograms.

This instrument is designed mainly for shop use and can determine the cause of vibration on the spot. The stroboscopic bulb indicates the location and unbalance of rotating parts, and the machine can be balanced at its place of operation. The instrument can be used with equal success for eliminating vibration from mechanism weighing several kilograms and aggregates weighing up to tens of tons.

Many examples can be cited where the application of this vibroscope has eliminated rejects and put back into operation machines which had been abandoned because of excessive vibration.

Among Leningrad enterprises that have adopted this new apparatus are the Lenenergo electric power stations, Pnevmatika Plant, Plant imeni Vtoroy pyatiletki, Machine-Tool Building Plant imeni Il'ich, and Electrik Plant. Other plants, however, are still satisfied with old methods such as making "allowances" for machine vibration. These include the Kirov, Elecktrosila imeni S. M. Kirov, and Russkiy dizel' plants.

TRANSFORM CAST-IRON CHIPS INTO COILS -- Moscow, Slavyanye, Jan 51

"Discontinuous" or segmental chips are always produced when cast iron is machined. This has always been a problem to lathe operators because flying chips frequently injure those working in their vicinity. High-speed cutting of cast iron was unthinkable. However, Boris Kulagin, a lathe operator at the Moscow Grinding Machine Plant, tried increasing the speed and discovered that his problem was solved. By increasing the feed and speed of cutting, the cast iron became heated to a very high temperature. Individual chips fused and formed a continuous cast-iron ribbon. The continuous chips formed coils and fell to the floor.

Kulagin has achieved a cutting speed of 470 meters per minute but considers this inadequate, even as a beginning.

LENGTHEN LIFE OF ID63A LATHE -- Tbilisi, Zarya Vostoka, 28 Jul 51

Workers, engineers, and technicians at the Tbilisi Machine-Tool Building Plant imeni S. M. Kirov have resolved to lengthen the life of the ID63A screw-cutting lathe.

This model has been in production only a few years. In this time, it has been subjected to many changes in design. Its operational qualities have been improved, and consequently its life has been lengthened. This field, however, is far from exhausted. The task of increasing the length of life of the lathe

was presented again this year. This problem can be solved successfully by further modernizing production techniques, completing the conversion of production to conveyer methods, further disseminating Stakhanovites' and innovators' experiences, and increasing the political consciousness and technical training of the plant personnel.

The Five-Year Plan for production was fulfilled 133.6 percent. In addition, labor consumption for producing the machine was decreased five times and its production cost lowered. As a result of modernization, the number of spindle revolutions per minute was increased from 420 to 750. The power of the drive was increased from 7.7 to 10 kilowatts. High-speed methods of metal cutting are now possible on the ID63A machine. The gear-box friction clutch was reinforced, and the gear pump for coolant was replaced by an electric pump. All this has increased the life and reliability of the machine tool in operation.

Other units in the machine were also modernized. Quick-wearing units were replaced by those of more modern design. For example, spindle sliding friction bearings were replaced by double-row precision bearings, which increased the machine-tool's rigidity and accuracy.

Bronze bearings for the gear box friction clutch wore rapidly. They were replaced by ball bearings. In the event of improper shifting of the feed-box lever, gears and shafts were apt to break. By introducing an interlock for shifting levers, the danger of breakage was removed.

Hardening parts by high-frequency current has also increased the life of the lathe.

A wide application, in production, of high-duty attachments, of special combination boring and milling machines, and of the principle of successive technological transfer of parts from one operation to the next, have all contributed toward increasing the quality of parts machined.

Realizing that one of the most important conditions for the long life of a machine tool is the production of high-quality parts, plant personnel are doing a great deal of work in this field. Before the basic inspection of a finished group of parts, the Technical Control Division conducts a preliminary inspection of the first part of a group. This method of inspection greatly increases the prevention of defects. Quality of parts is also checked right at the worker's location.

Although considerable progress has been made, many unsolved problems remain, the solution of which could increase the life of machine tools. The first step is to perfect case hardening of bed ways by the use of high-frequency currents, and the grinding of gears of the main drive mechanism. -- K. Goglidze, secretary of the Party Bureau, Tbilisi Machine-Tool Building Plant imeni S. M. Kirov; G. Khocholava, senior designer, Technical Division; P. Abesadze, senior designer, Designing Division

PERFECT 28 TYPES OF METAL-CUTTING MACHINE TOOLS -- Tbilisi, Zarya Vostoka, 5 Jul 51

The Tbilisi Machine-Tool Building Plant imeni Kirov increased its production of machine tools during the Five-Year Plan 3.5 times, and perfected more than 28 types of metal-cutting machine tools. An unprofitable enterprise at the beginning of the Five-Year Plan, it became a profitable one at the end of that period.

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PRODUCE SEVEN DIP-300 LATHES ABOVE PLAN -- Yerevan, Kommunist, 5 Jul 51

The Tbilisi Machine-Tool Building Plant imeni Kirov completed the half-year plan for gross production 101.5 percent. It produced DIP-300 lathes above plan.

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